Appendix B – River Reroute Work Plan

KANEKTOK RIVER REROUTE CONSTRUCTION WORK PLAN

QUINHAGAK, ALASKA

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January 24, 2020

Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will copy correctly when duplexed.

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APPENDICES

Introduction

The community of Quinhagak in southwestern Alaska is threatened by riverine erosion along the reaches of the Kanektok River (the river) that runs through the community. Qanirtuuq Incorporated (Qanirtuuq), an Alaska Native Village Corporation located in Quinhagak, sought to attain a better understanding of the erosion dynamics along the Quinhagak reach of the river to aid in the design of protection measures for the community.

CRW, Inc. (CRW) contracted with Herrera Environmental Consultants (Herrera) to support this effort and together produced an Erosion Study (CRW 2018) and Preliminary Hydraulic Report (Herrera 2019). This report assessed the hydraulic and geomorphic impacts associated with three alternatives to reroute the Kanektok River to protect the community and direct the river's forces away from infrastructure. Feedback on the report, by the community, was received and the decision was reached to proceed with further developing Alternative #1, which is river reroute immediately upstream from Quinhagak's infrastructure. The conceptual design includes preliminary design sequencing, required equipment, scheduling, cost estimates, and project expectations.

Purpose

The purpose of this construction work plan is to identify project elements and actions and outline the logistics and planning required to construct the Kanektok River reroute conceptual design. The work plan is intended to provide specific logistic information to the decisionmakers as to the process required to implement the river reroute alternative. This document is also intended to serve as a description of the project to engage permitting agencies and identify the impacts and proposed mitigative actions for the project. This work plan includes a concept site plan with sections of the river reroute design as well as construction limits, staging areas in Appendix A. Construction sequencing, equipment, and scheduling are described below.

Proposed Action

The range of options examined several potential locations for river routing. But only Alternative #1 described in this work plan protected infrastructure efficiently and without significant off-site impacts. The alternative includes the creation of approximately 1700 feet of new channel through a single native allotment and adjacent federal lands. The project includes over 1000 feet of in-channel construction work. The new main channel construction is detailed in the design drawings in Appendix A.

Sequence

Work will be performed in three distinct phases: 1) site preparation, 2) historical channel excavation, and 3) new main channel construction.

Phase 1: Mobilization and Site Preparation

Mobilization of the equipment to the site will require a barge. Equipment will be offloaded at the work site according the plans in Appendix A.

1. Mobilization

    - Equipment (see list in section below) will be transported to the landing site (see Appendix A for location) on the north side of river. It is assumed that the equipment will be shipped in, possibly on the same tug and barge used to deliver the equipment to the site.

    - Barging of equipment will require coordination with high tides and reasonably high river water levels to access the river and the site using the prescribed tug. It may be necessary to temporarily stage the equipment at the village terminal to obtain proper tidal timing. Barge landing at site should occur near peak flood so as to best ground the barge. River flooding (out of bank flow) conditions should be avoided.

2. Construct access road

    - Clear brush within the barge landing site, access road area, making sure to make ground level enough to drive other equipment over with ease where necessary.

    - Clear brush along the new channel alignment, new access road and spoils pile locations (see Appendix A for locations).

3. Work area isolation and fish exclusion

    - Load super sack bags with gravel from preliminary excavation of channel alignment.

    - Place block net locations shown in Appendix A.

    - Extract fish using seine net or equivalent into 5-gallon buckets and return them to the main stem of the Kanektok River near barge.

    - Place super sack bags on the inside (to the work area) upstream and downstream areas of the 1950s channel.

    - Remove block nets.

Phase 2: Historical Channel Construction

Phase 2 consists of excavating the existing historical channel and constructing an isolation berm to prevent the river from short-circuiting the historical channel. The work will:

4. Pump work area as dry as necessary/weather permitting/as practicable. Pump discharge to discharge point in Appendix A.

5. Excavate the existing historical channel to drawing specifications.

    a. Place recently excavated material as necessary to fill to create berm. Compact placed material with on-site equipment (i.e., bucket tamping with excavator).

    b. Once isolation berm is complete, spoils will be placed in the spoils storage area south of the new channel (see Appendix A for location). Place material here until historical channel has been completely excavated per plans in Appendix A, using an excavator (see Equipment section for details) to load a minimum of two Morookas (tracked loaders) circuit that delivers material to the spoils area shown in Appendix A. The spoils area will be used to stage material for the isolation berm and other later uses and to allow for a modest amount of dewatering. It is possible to leave the spoils where they are for multiple seasons.

6. Remove bulk bags from downstream (northwest) first and use a few of the salvaged bulk bags to protect new channel areas of the historical channel from the new main channel excavation. Stockpile others for Phase 3 main channel isolation.

Phase 3: New Main Channel Construction

7. Excavate new main channel with excavator while placing spoils to the southeast (see Appendix A for details) per ADOT&PF Specifications Section 305, being sure to leave a no smaller than a 15-foot wedge of earth at what will be the upstream end of the new main channel (i.e., at the confluence of the existing channel and the new main channel).

8. Place bulk bags in existing main channel around the proposed excavated area in the existing main channel, beginning at the upstream end, weather/conditions permitting (i.e., if river is flowing). If unfrozen:

    a. Extract fish using seine net or equivalent into 5-gallon buckets and return them to the main stem of the Kanektok River on other side of bulk bags if necessary.

    c. Pump work area dry as necessary/weather permitting/where practicable. Discharge pump to new main channel excavation.

    d. Excavate existing main channel as per Appendix A.

9. If frozen or dry, excavate without isolation or fish exclusion.

10. Once excavation is complete and if the river remains unfrozen, remove bulk bags starting from upstream end.

11. Excavate 15-foot wedge described above (in #10) per Appendix A from the south side of the new main channel, working south across the wedge.

Equipment

The following is an itemized minimum equipment list needed to complete all three phases of construction work:

- Four 25x8-foot block nets
- One 4-foot by 25-foot minnow seine net
- Two Morookas (2200 series or larger)
    - Morookas are necessary to maximize the efficiency and complete project on time. Boggy conditions may persist, particularly in the vicinity of the 1950s channel, so low-pressure equipment is recommended.
- Excavator: CAT 325D (or similar)
    - A single excavator will be the main piece of equipment utilized to construct all grading work. The working range of this equipment produces ample digging depth, with double the required digging depth capacity.
- Lease *M/V Spencer Brewer* (out of Naknek) and a 53-foot platform from Alaska Marine Lines or similar shallow-draft tug and platform
- 200 bulk bags (count assumes 1 cubic yard bags)
- 10 HP trash pump or equivalent
- 100-foot, 4-inch HDPE pipe or equivalent
- Several 5-gallon buckets
- Fuel is assumed available from the village terminal
- Material to fill bulk bags is assumed to be available on-site

Phase 1 of the Work Plan will require the employment of at least 5 laborers and 3 operators (1 CAT operator and 2 Morooka operators). Multiple laborers are required for the first phase of work in order to efficiently land the barge (barge landing location in Appendix A), clear brush efficiently in the work area, exclude fish from the work zone, and help navigate the CAT and Morooka operators. Three operators are also suggested so that material can be moved efficiently in Phases 2 and 3. Less laborers will be needed for these phases.

Schedule

It is recommended work start in October ending in January to avoid fish migration periods and take advantage of the wintertime low-water. Each phase is expected to take a full month to complete with an additional month included to provide float and provide low-flow and/or frozen conditions when most main channel work will occur. The main constraint on wrap-up of the project is the freshet. It is best that the new channel be opened (i.e., Phase 3 completed) immediately prior to the freshet, so low-water siltation of the new channel entrance is minimized.

Optional Follow-On Activities

The conceptual design laid out in this report is focused on the ease of construction for completing the channel excavation necessary to reroute the Kanektok River. If the gravel from most of the excavation is desired, there are two ways to transfer it to the community on the opposite bank, likely preceding Step 11 above. One way would be to acquire up to three additional 53-foot platforms from Alaska Marine Lines (or equivalent), along with the existing platform, and together fashion them as a temporary bridge. One Morooka could be taken out in the circuit and used to haul material to the opposite bank. Alternatively, an ice bridge could be constructed if conditions are favorable, again using the second Morooka to transfer material. However, since only one Morooka will be used to complete the excavation, it will slow final excavation process. So long as construction is complete before the freshet begins, these delays should have no effect on project performance.

The tug and barge platform may also be used to dredge the marina, once the equipment is located to the work area.

Future Expectations

From previous modeling (Herrera 2019), the velocity in the new channel, as well as the remainder of the former side channel, indicate that the diversion of flow will likely be maintained and might widen over time. It can also be seen that the velocity in both bends subject to erosion currently (i.e., at both ends of the old runway) are lowered significantly, though the effects are much more pronounced near the east end. The lowered velocities will likely initiate deposition in the former main channel and may eventually cause abandonment of it between where the

channel has been diverted and the downstream end of the new channel. The lack of change in velocities suggests that downstream hydraulic impacts will be minimal.

The large velocities in the diversion channel and the new channel may produce large volumes of sediment as flow concentrates there, which may influence downstream areas following construction. This could initiate more channel migration downstream of the diversion. It could also produce additional deposition in the harbor, as the channel equilibrates to the new condition. Most of this change should occur in the first year, and mostly during the largest flow events, like the peak freshet. Informal (community) monitoring of the tip of the Old Town peninsula and the revetment upstream of the water intake is recommended. Some additional (greater than normal) erosive pressure is expected in these areas, once additional sediment is being transported through the new channel. However, these effects should be short-lived. If the channel alignment downstream of the confluence of the new channel changes significantly and permanently (i.e., for more than one year), additional monitoring and analysis may be required.

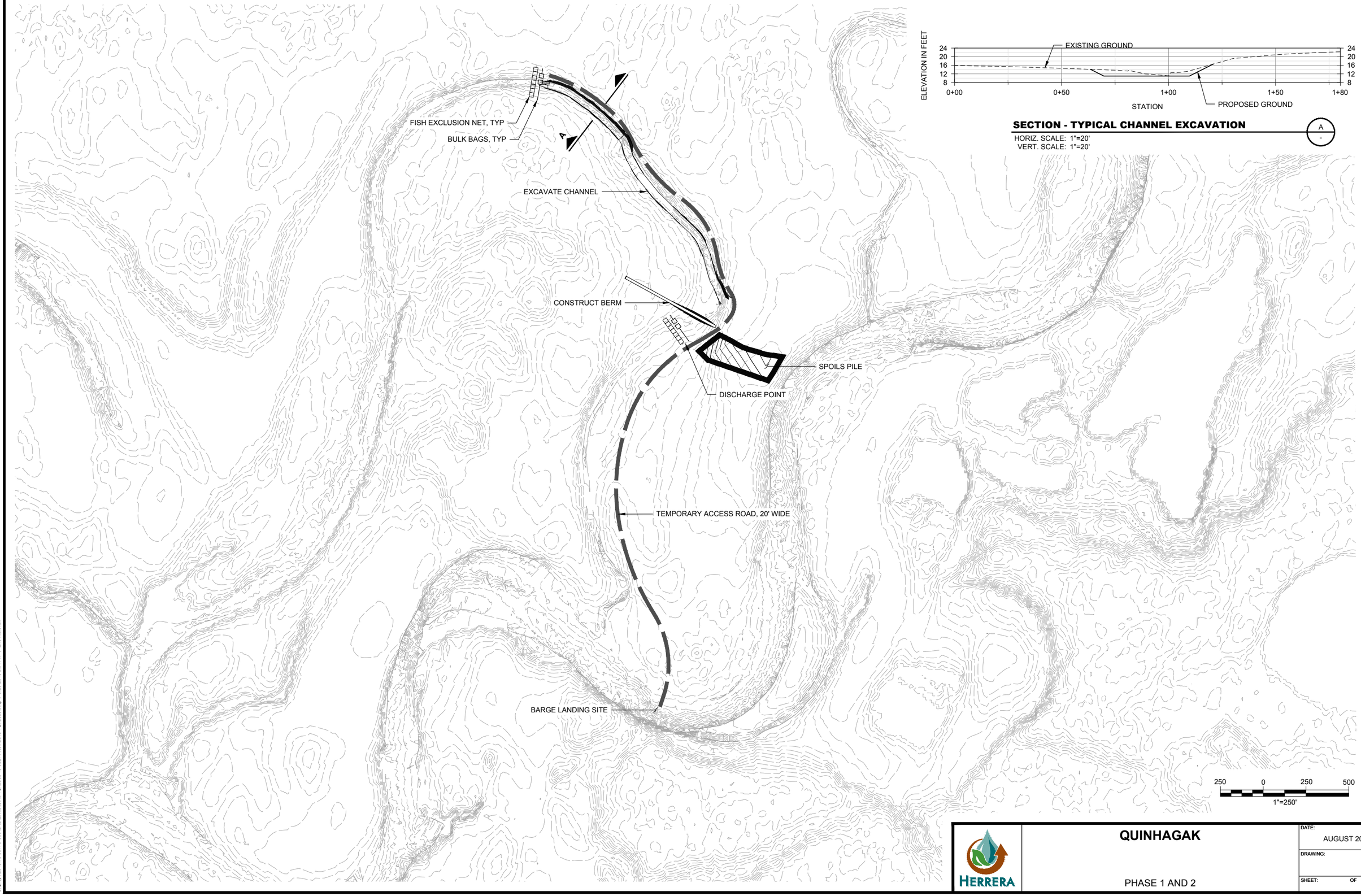
REFERENCES

CRW. 2018. Quinhagak, Alaska: Kanektok River Erosion Study. Prepared for: Qanirtuuq, Inc. October.

Herrera. 2019. Preliminary Hydraulic Report: Quinhagak Erosion Mitigation Planning Study. Prepared for: CRW Engineering Group, LLC. February 25.

APPENDIX A

Design Drawings



SECTION - TYPICAL CHANNEL EXCAVATION

A
-

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=20'

250 0 250 500
1"=250'

N

QUINHAGAK

PHASE 1 AND 2

DATE: AUGUST 2019
DRAWING:
SHEET: OF -

HERRERA

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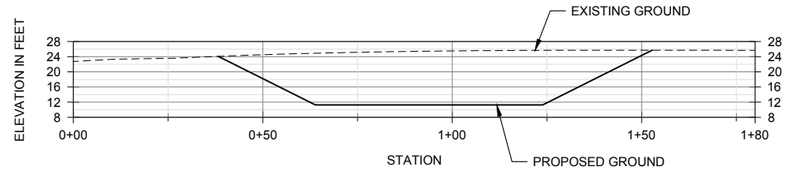

SECTION - TYPICAL CHANNEL EXCAVATION A -

HORIZ. SCALE: 1"=20'
VERT. SCALE: 1"=20'

BULK BAGS, TYP

CHANNEL EXCAVATION

SPOILS PILE

TEMPORARY ACCESS ROAD, 20' WIDE

POTENTIAL TEMPORARY ACCESS
BRIDGE (4 BARGES), APPROX 215' x 40'

250 0 250 500
1"=250'

N

HERRERA

QUINHAGAK

PHASE 3

DATE: AUGUST 2019

DRAWING:

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